

Metso

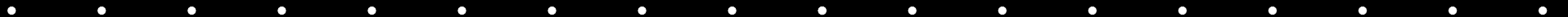
Cone Crusher Evolution

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Material Process Business Manager

Garth Taylor
14 September 2026



MIMICO



Metso Aggregates Crusher Range



Nordberg® C Series™
Jaw crushers



Nordberg® HP Series™
Cone crushers



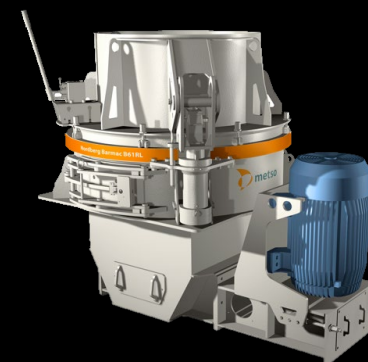
Nordberg® GP Series™
Versatile and secondary cone crushers



Nordberg® NP Series™
Horizontal Shaft Impactor (HSI)



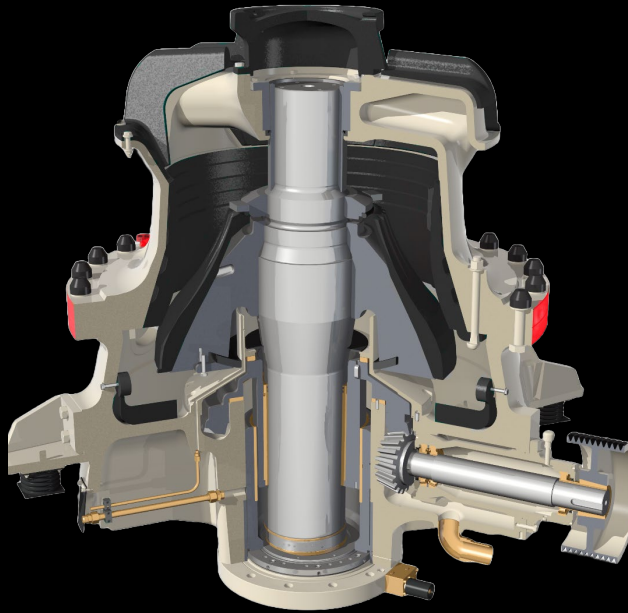
Metso HRC™
High pressure grinding roll



Barmac® B Series™
Vertical Shaft Impactor (VSI)

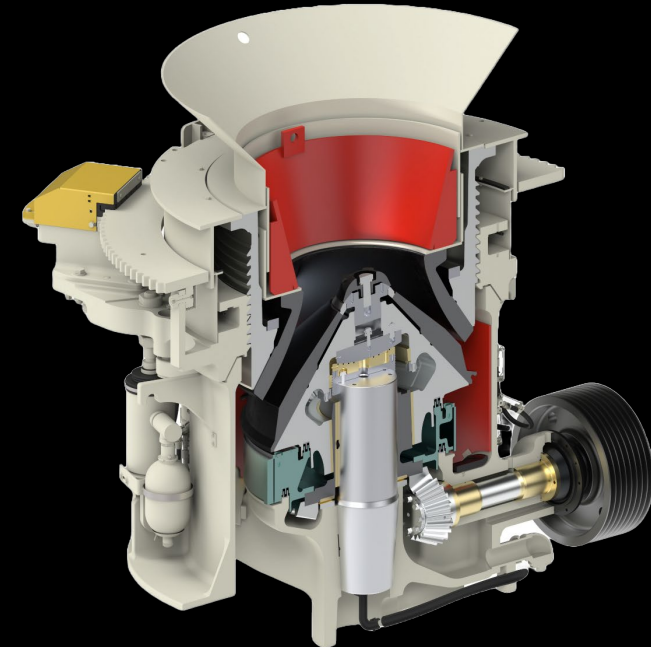
Cone Crusher Technology

Hydraulic versus fixed shaft cone crushers



Nordberg GP Series:

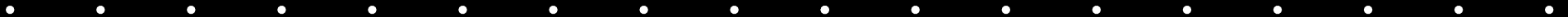
- Hydraulic cone crusher with floating shaft
- Available as secondary and versatile units
- Allows varying feed and fines



Nordberg HP Series:

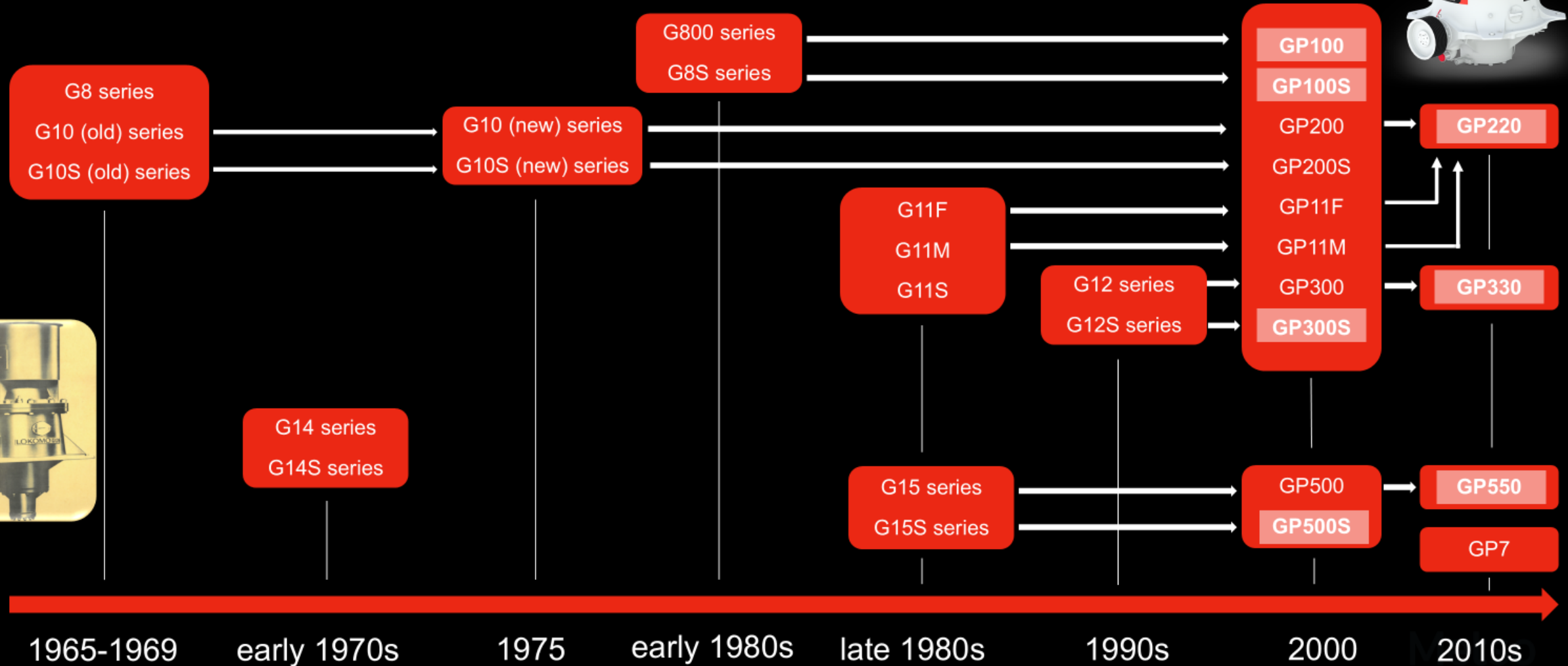
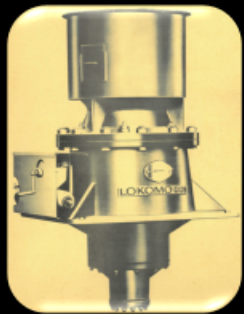
- Fixed shaft technology
- Configured to fit specific application
- Best performance with constant feed

Nordberg GP Series™ Cone Crushers



Nordberg GP cone crushers

In production



GP Secondary

GP100S



GP300S



GP500S



Weight
Power
Top feed size

7.7 t (17 000 lbs)
75-90 kW (100-125 HP)
236 mm (9 9/32") (C)

17.1 t (37 700 lbs)
132-250 kW (175-335 HP)
320 mm (12 19/32") (EC)

34.3 t (75 600 lbs)
200-355 kW (300-500 HP)
392 mm (15 7/16") (EC)

GP Versatile

GP100



GP220



GP330



GP550



Weight
Power
Top feed size

6.2 t (13 700 lbs)
75-90 kW (100-125 HP)
135 mm (5 5/16") (C)

11.1 t (24 470 lbs)
132-200 kW (175-300 HP)
204 mm (8 1/32") (EC)

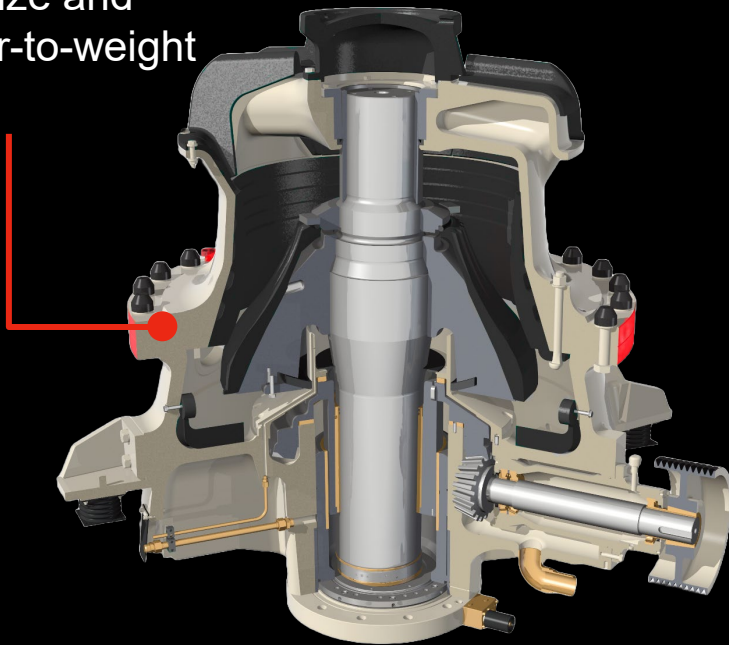
16.6 t (36 600 lbs)
250-315 kW (335-400 HP)
215 mm (8 7/16") (EC)

28.7 t (63 270 lbs)
250-355 kW (335-500 HP)
234 mm (9 1/4") (EC)

Different designs to match your application

Main differences between GP Versatile and GP Secondary

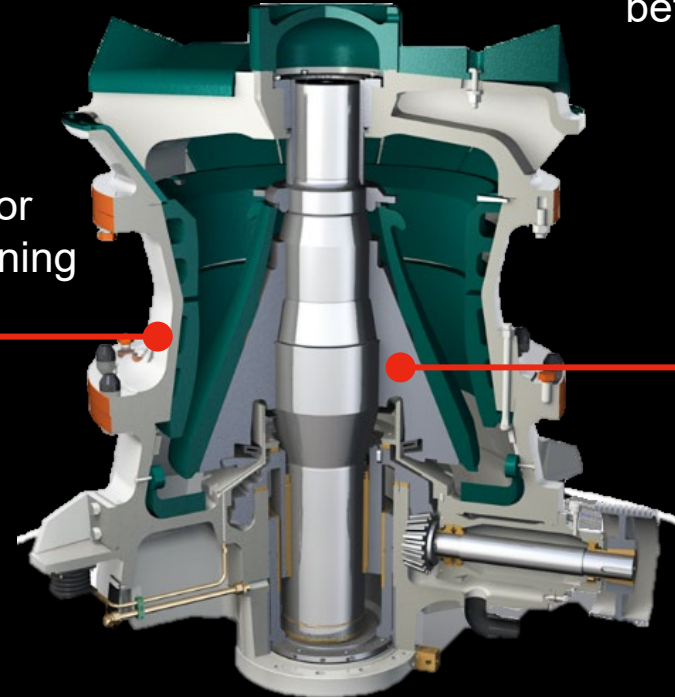
2-piece frame for compact size and high power-to-weight ratio



GP Versatile

Design that can be utilized in various applications

3-piece frame for larger feed opening



GP Secondary

Designed for 2nd stage crushing

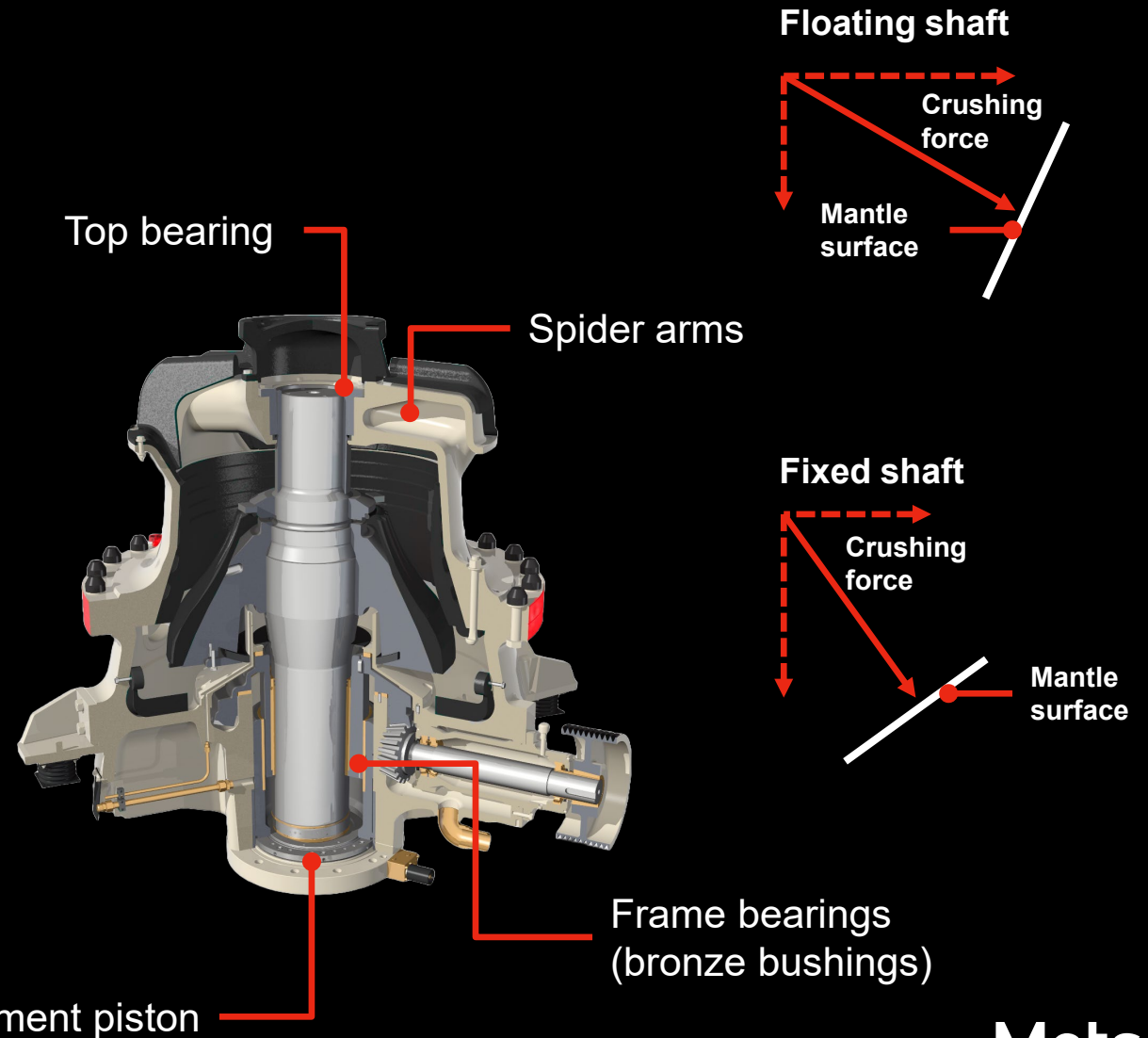
Taller head and steeper cavity for better throughput and fines processing

GP Series dual-supported floating shaft benefits

Aggressive cavity design

- Top bearing and frame bearings carry the horizontal crushing forces, allowing a steep and vertical cavity with good grip on rock, high throughput and **less fines production**.
- Vertical crushing forces can be seen as **piston pressure**. Large piston diameter limits the crushing pressure, less load on hydraulic system.
- Design produces very little head spin with empty cavity and allows on-off feed

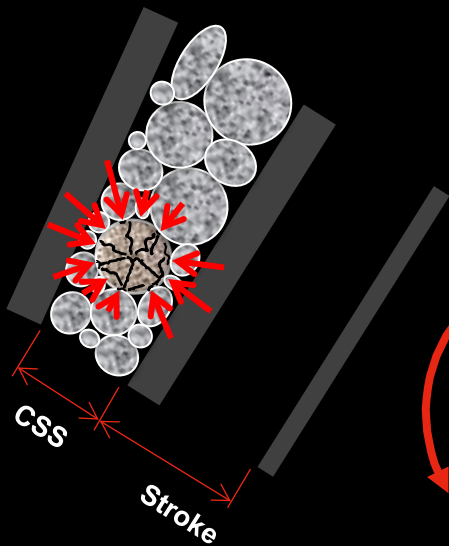
Ability to tolerate horizontal forces allows a steeper cavity!



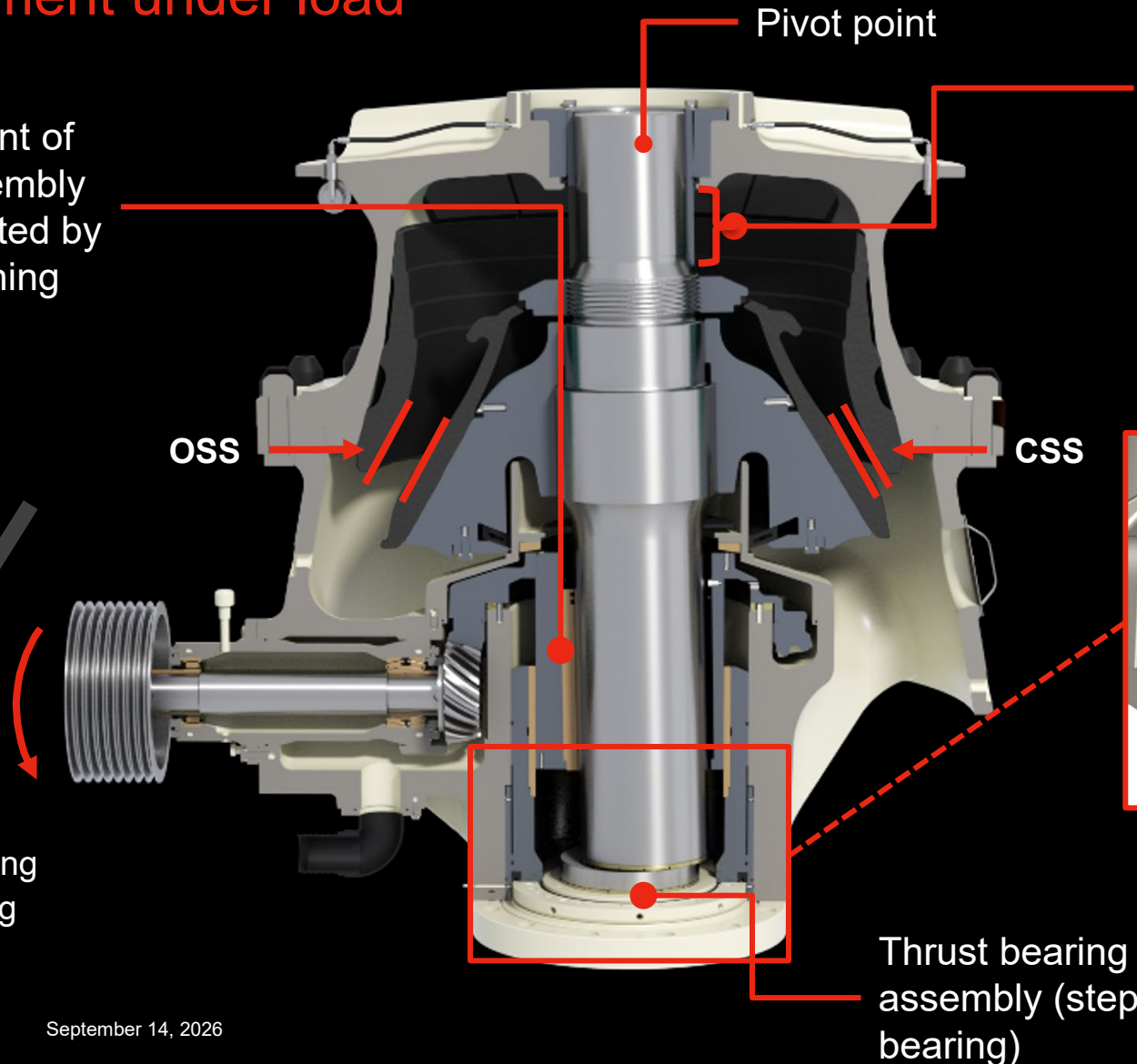
GP Series dual-supported floating shaft benefits

Setting adjustment under load

Eccentric movement of the main shaft assembly for crushing is adjusted by the eccentric bushing



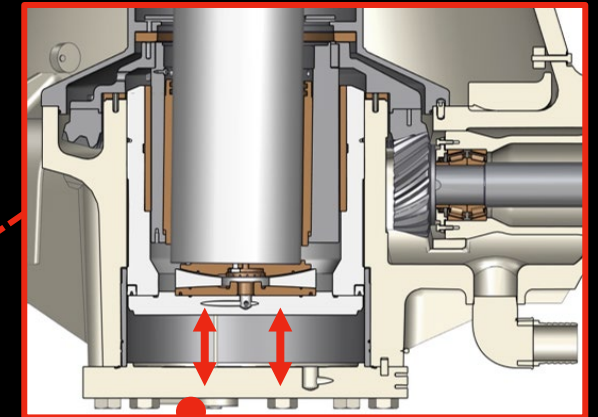
CSS = Closed Side Setting
OSS = Open Side Setting
Stroke = OSS-CSS



Pivot point

Long main shaft working area allows thick liners for long life

Vertical movement of the main shaft assembly for setting adjustment is controlled by oil volume.



Piston position sensor (setting sensor)

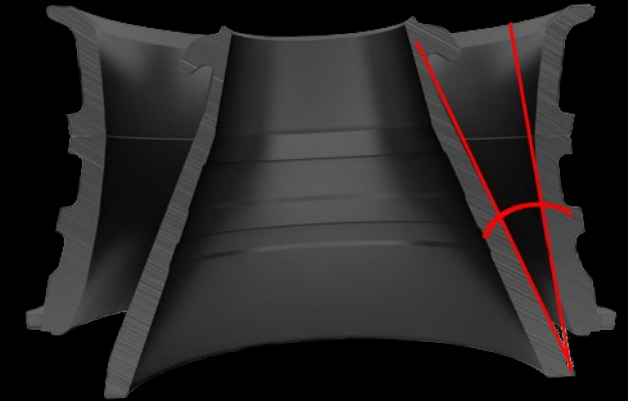
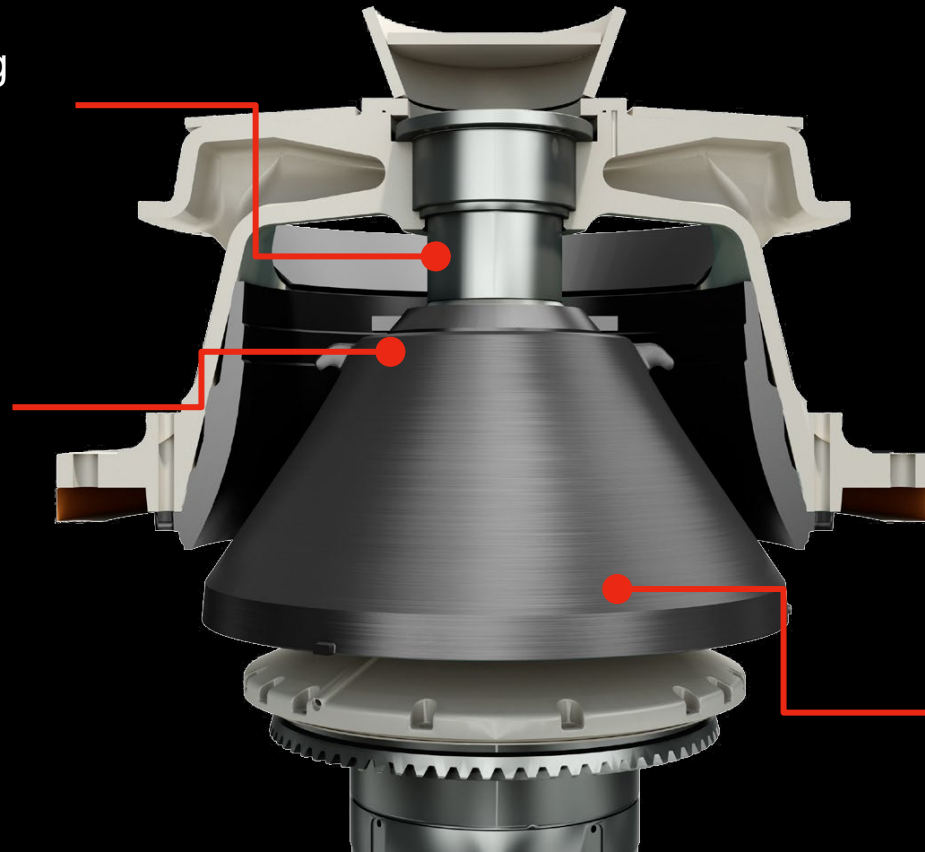
Thrust bearing assembly (step bearing)

GP Cone crusher kinematics

High pivot point improves efficiency

Large main shaft working area allows thicker liners and longer lifetime

Long stroke at the top of the cavity increases efficient crushing area



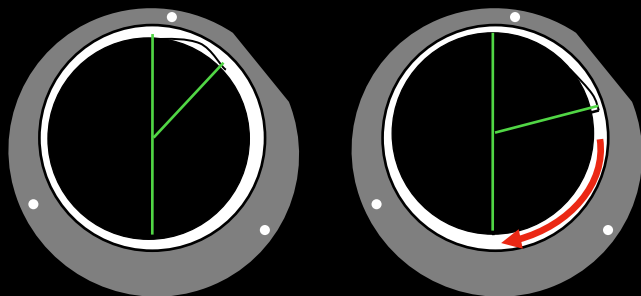
Aggressive nip angle and perpendicular movement prevents boiling effect and provides excellent grip

Design produces very little head spin with empty cavity and allows on-off feed

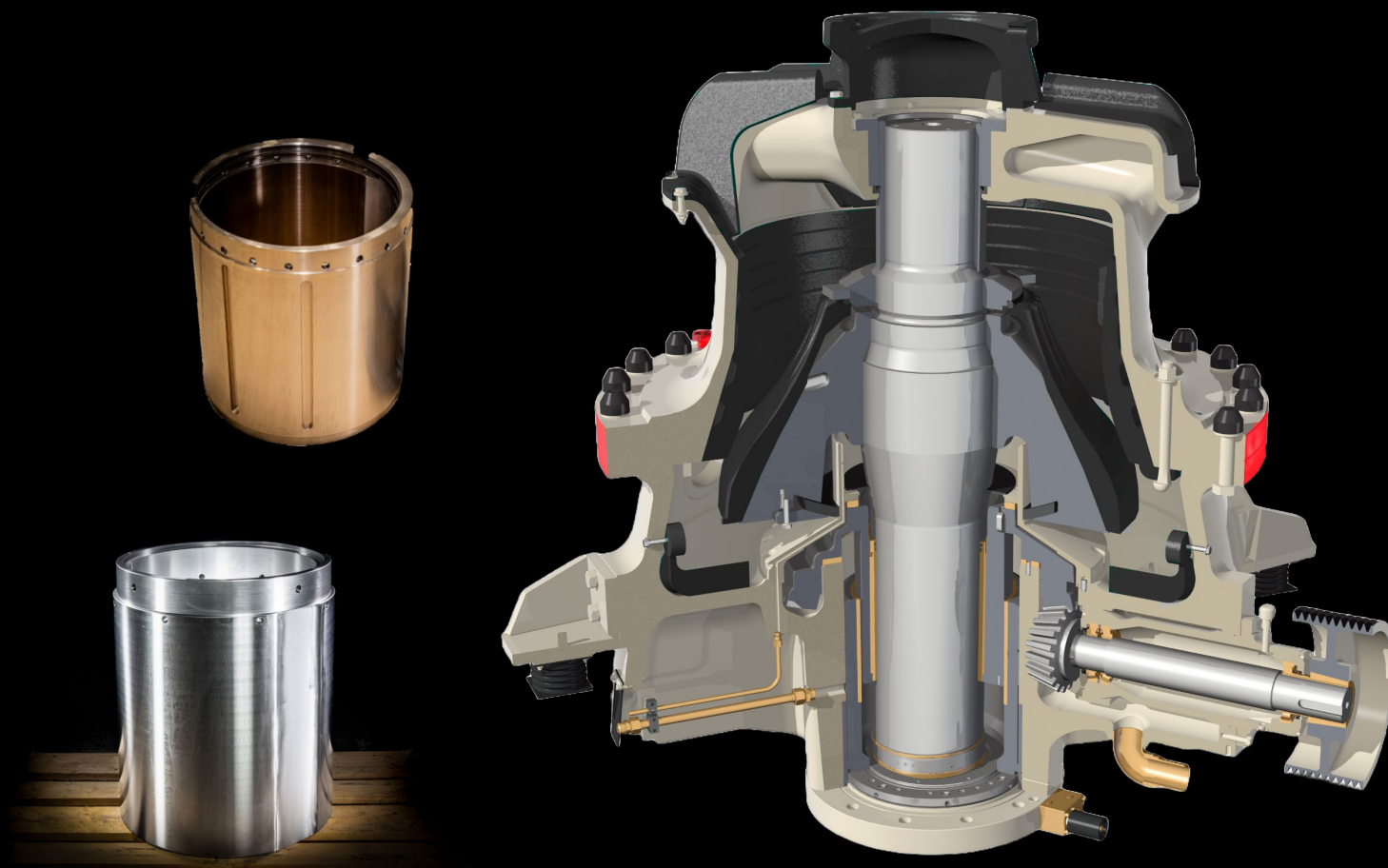
Adjustable stroke in all GP Series crushers

Stroke can be selected and easily adjusted for best applicational fit

Stroke can be adjusted by turning the eccentric bushing inside the eccentric shaft

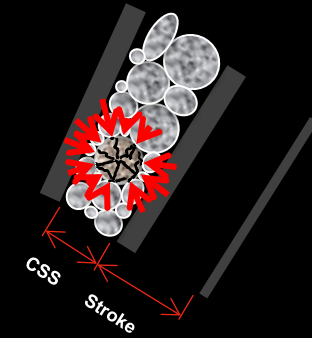


Alignment of the thickest points of the bushing and the shaft defines the eccentric movement



GP Cone crushers adjustable stroke

Optimizing process



Long stroke

- Increase capacity and power draw
- Larger product top size
- Increased fines generation
- Limits close side setting range

Short stroke

- Steeper product curve and more precise fractions

Minimum close side setting is limited by power and pressure

Throughput capacity

Stroke
decrease



Stroke
increase



Power draw



End product top size



Amount of fines in product



Achievable CSS range



GP Cone crusher cavities

Wide cavity selection provides versatility to the crushing process

GP versatile are primarily designed for tertiary applications, with secondary use possible when the feed size allows and fines are removed.

GP Versatile

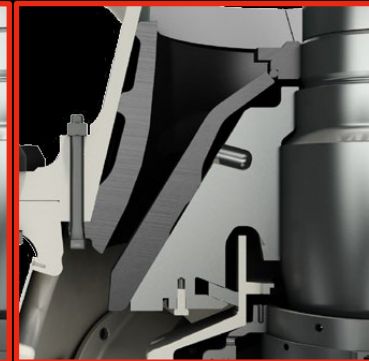
EC



C



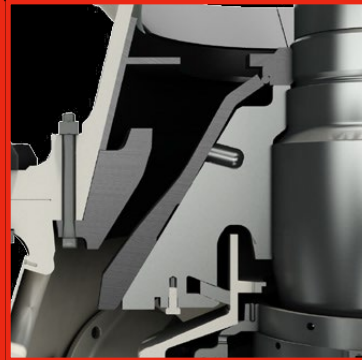
M



MF



F

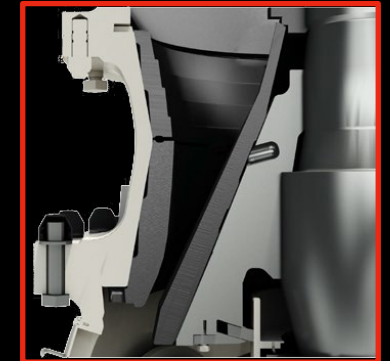


EF

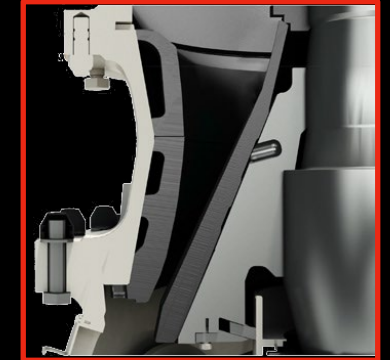


GP Secondary

EC



C



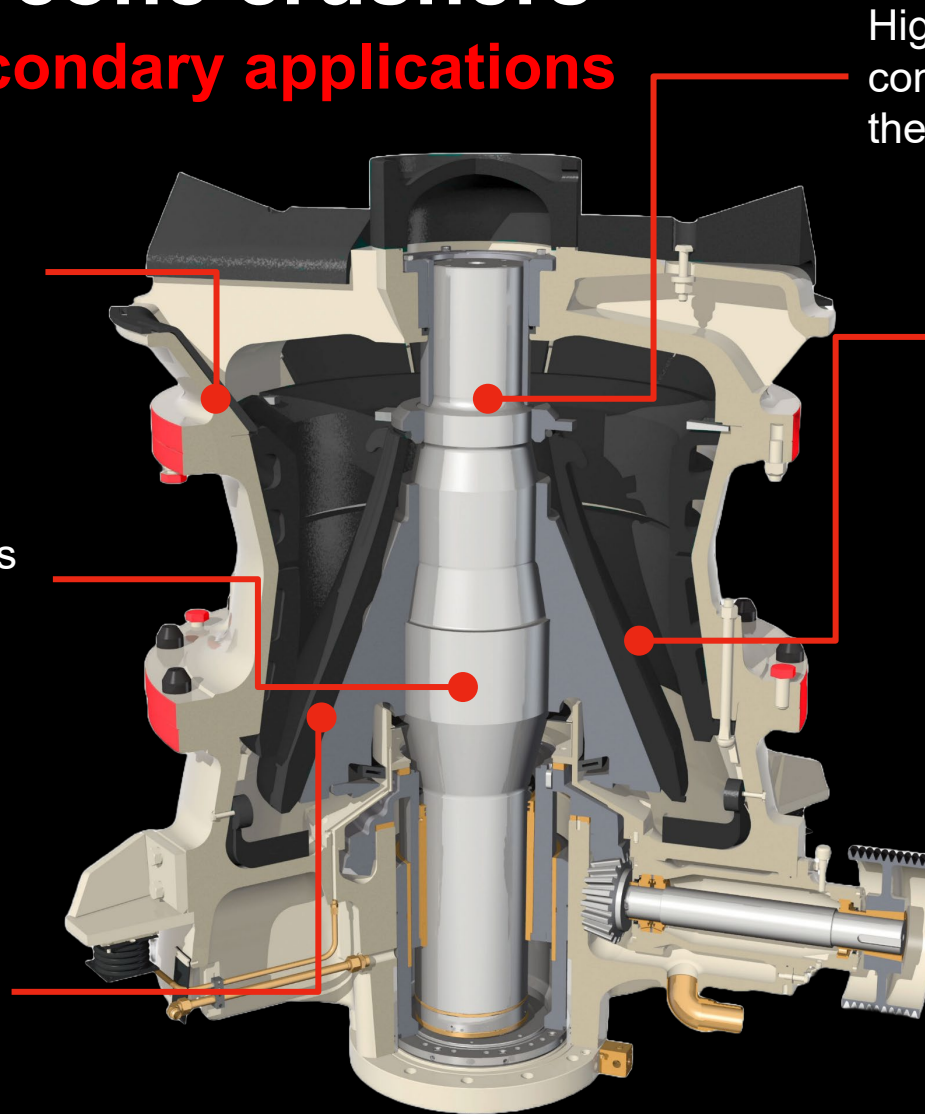
GP Secondary cone crushers

For demanding secondary applications

Extended upper frame allows large feed size compared to crusher dimensions

Well distributed crushing forces promote even wear patterns

Steep cavity utilizes gravity for increased capacity and great nip angle prevents boiling effect



High pivot point promotes direct compressive stroke starting from the top of the cavity

Long cavity has large crushing area for high reduction ratio, and it prevents risk of packing fines

Less fines production and accepts moist & slippery material.

GP design also prevents issues with on-off feed.

Nordberg GP secondary cones boosts your productivity in demanding secondary applications

- The process is normally not fully stabilized in secondary crushing stage
- Feed material flow may vary, especially in cases being fed directly and not through a stock pile or surge bin
- Nordberg GP secondary cones adapt well into varying feed conditions and delivers productivity through **capacity, reduction and uptime.**

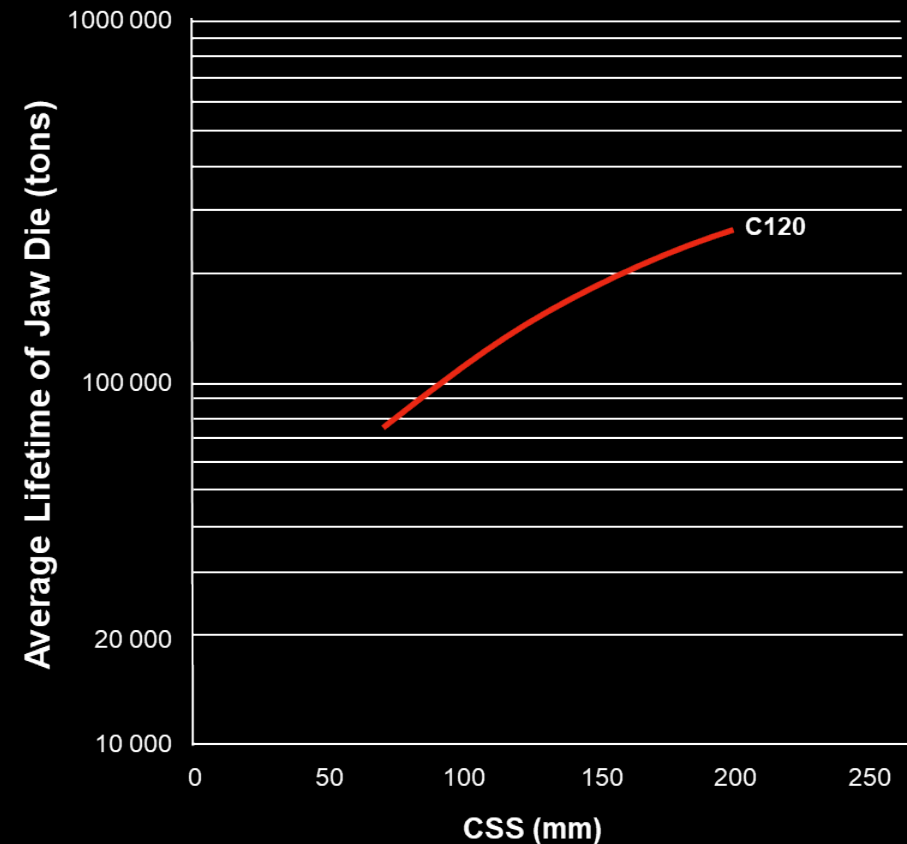


GP Secondary cone crushers

GP Secondary can increase process efficiency

- Primary crusher can work more efficiently, if secondary crusher accepts larger feed
- By opening the primary crusher CSS, capacity can be increased, and wear part lifetime extended significantly

**Increased
revenue
&
Reduced OPEX**



IC50C Crusher automation

Part of the standard delivery with GP Cone crushers

Easy to use

IC50C is designed for GP Crushers and is delivered as a complete package with crusher specific parameters

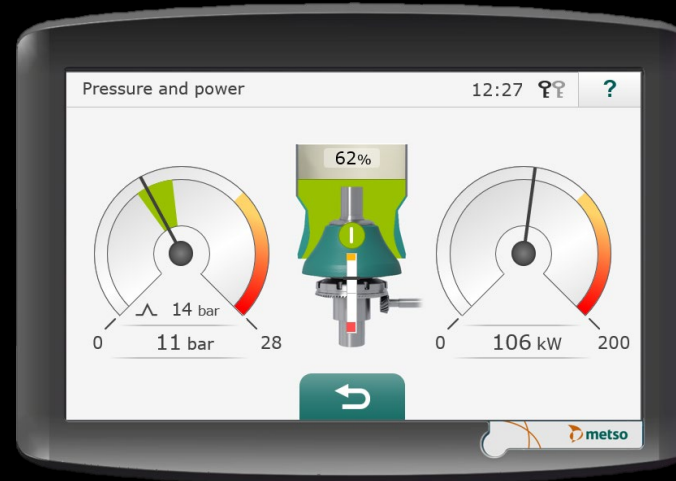


Safe & easy

Crusher can be controlled from a distance and the IC systems takes care of routine tasks

Uptime

IC50C protects the crusher and helps scheduling maintenance events



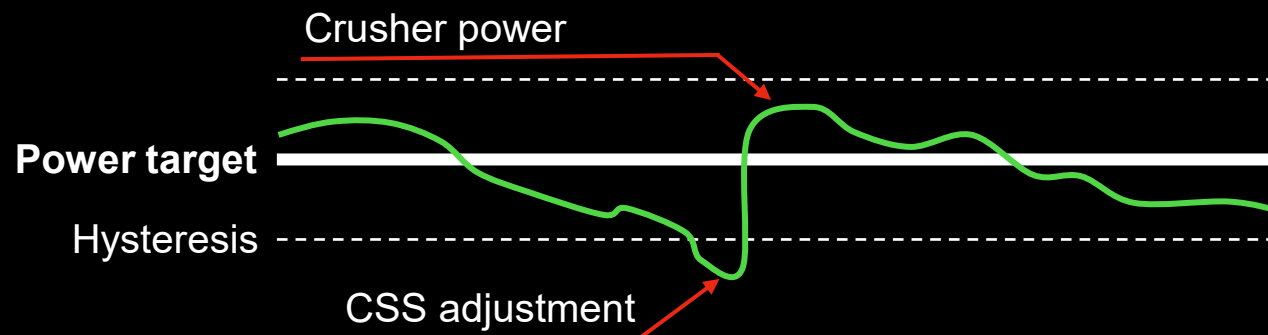
Performance

IC50C optimizes the crushing process to always provide constant throughput

IC50C Crusher automation

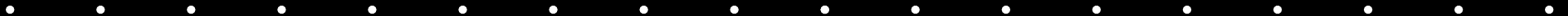
Load mode provides maximum performance and process stability

- In load mode the crusher CSS is constantly fine tuned to maintain desired power draw and consistent production
- This helps to achieve maximum production regardless of changes in feed characteristics, wear part condition or material level in the cavity
- Consistent load and stable process improves crusher lifetime

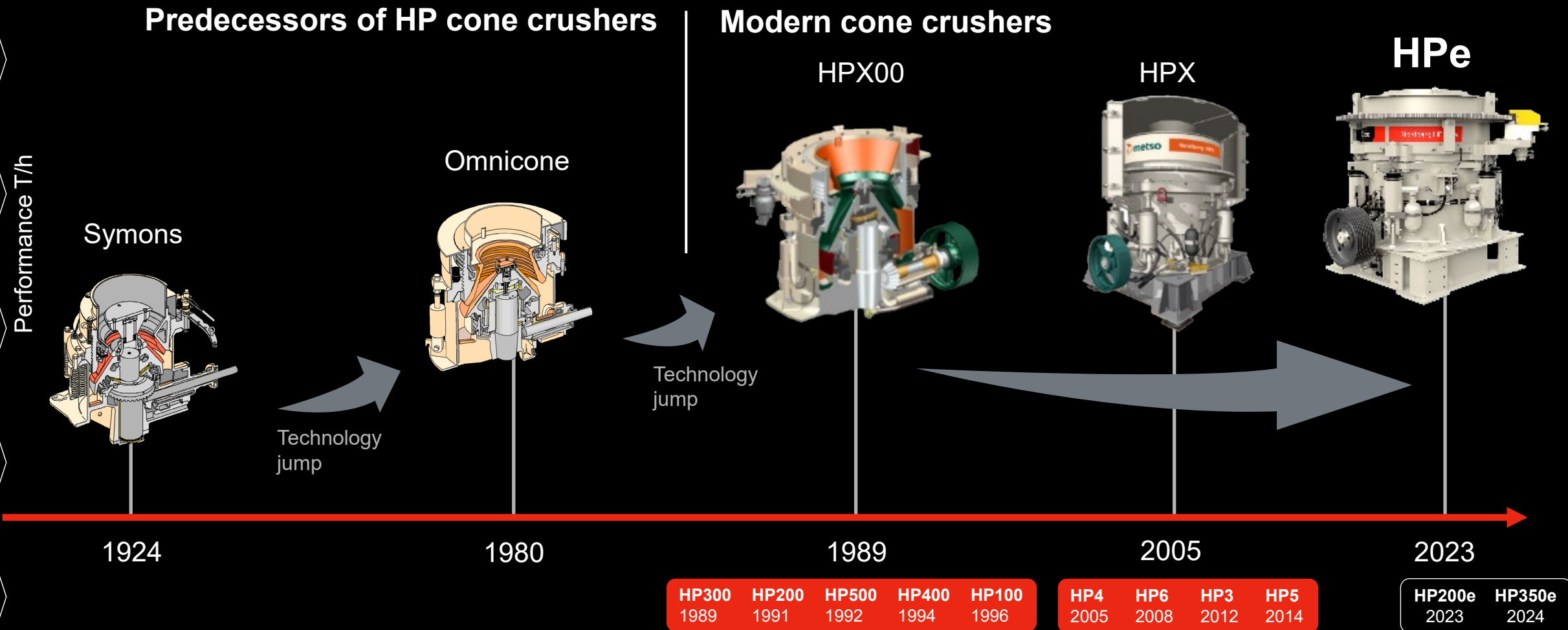


**Setting
mode also
available**

Nordberg HP Series™ Cone Crushers

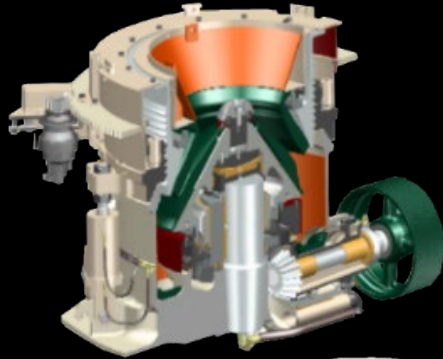


Nordberg HPe cone crushers are the result of a continuous evolution



Nordberg HP Cone Crusher Development

Evolution over the years to meet customer needs and demands



HPX00 (HP100, HP200, HP300, HP400, HP500)

- New innovative cone crusher technology since 1989
- Universal, giant leap in performance in terms of throughput and product shape with new principle (high speed, long throw, rock-on-rock crushing principle,...)



HPX (HP3, HP4, HP5, HP6)

- Responding to market needs in late 1990's and early 2000's
- Fine crushing efficiency, high reduction in open circuit, product shape, simplified flowsheets

HPe (HP200e, HP350e, HP450e, HP600e, HP800e, HP900e)

- Evolution and further development of HPX00 series
- Performance, up-time, application coverage, easy service

Nordberg HP Cone Crushers – Features

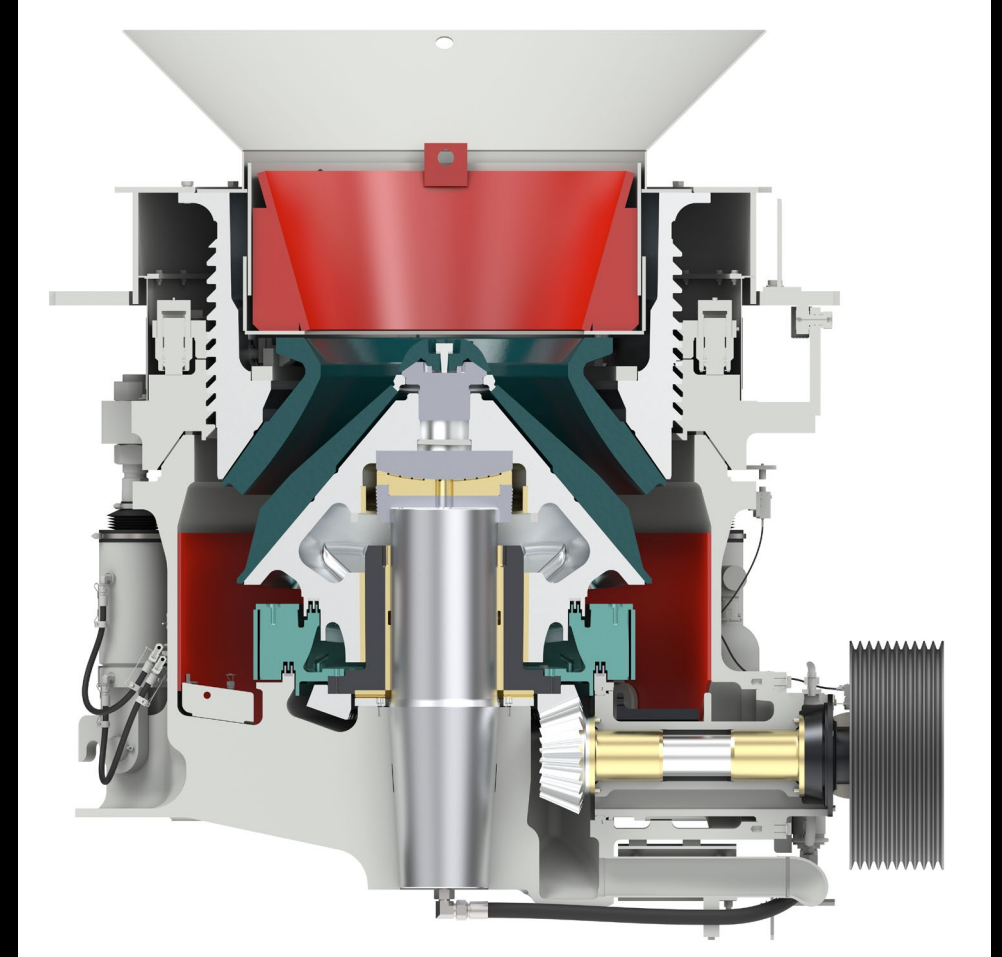
No spider on top of the cavity

In coarse applications:

- Improve feed intake capability and reduces risk of blockage in the crusher inlet

In fine applications:

- Enables end product gradation and capacity adjustment through material level adjustment



Nordberg HP Cone Crushers – Features

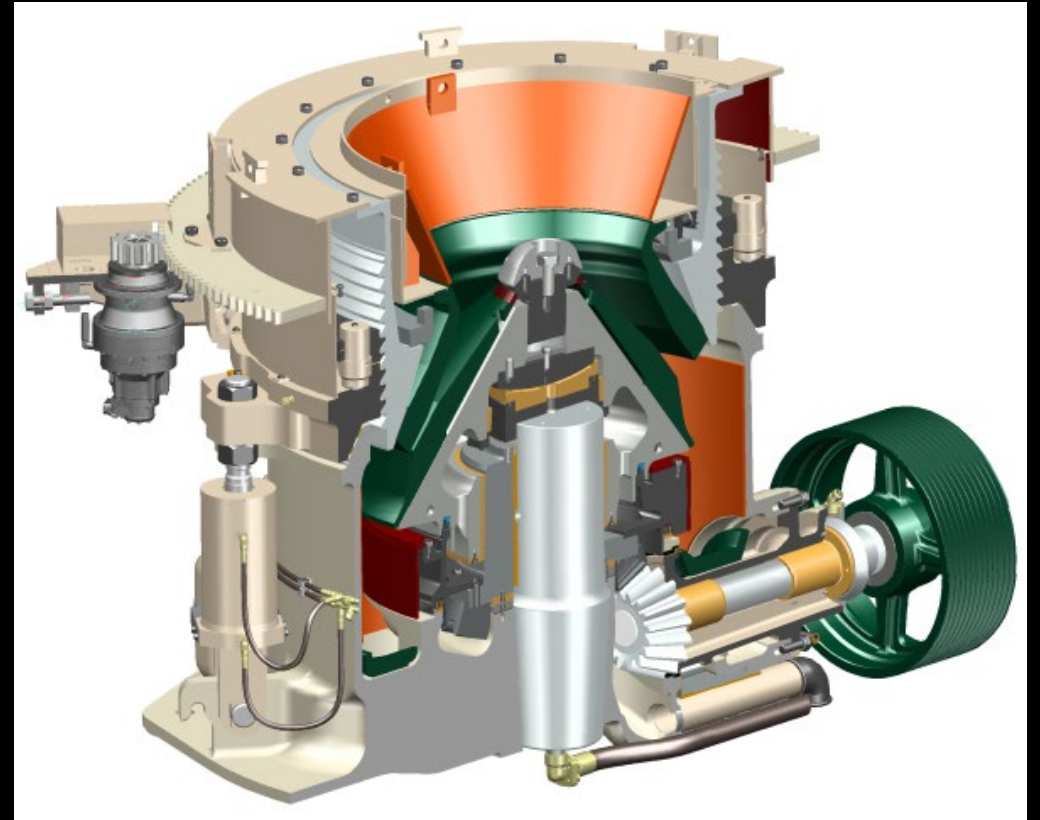
Crusher setting mechanically fixed

HP cones deliver predictable and consistent end product size and gradation

Setting is adjusted by rotating bowl

Setting is locked and clamped in place with adjustment ring and clamp hydraulic cylinders

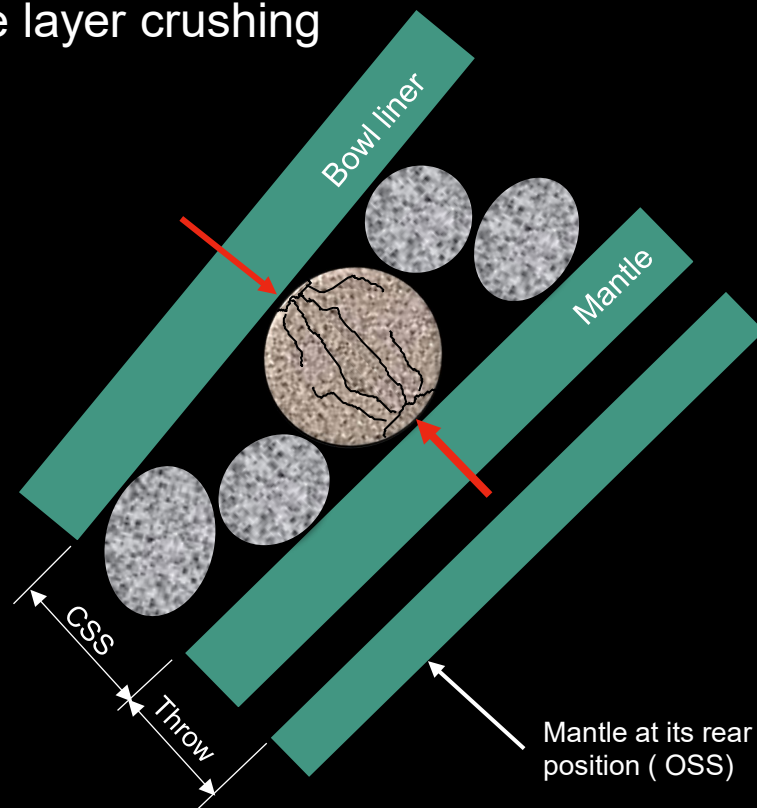
Uncrushable event is handled with tramp cylinders around the outside of the crusher



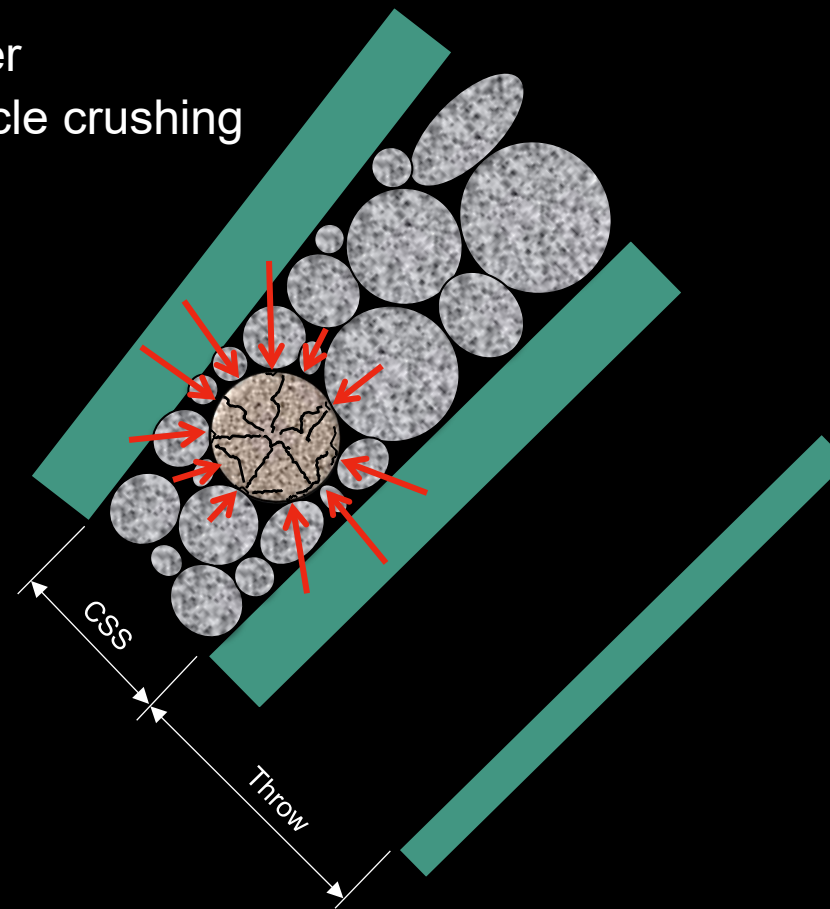
Nordberg HP Cone Crushers – Features

Interparticle crushing

Single layer crushing



Multi-layer interparticle crushing



Nordberg HPe Range

Comprehensive range of modern and innovative cone crushers



March 2023
at ConExpo
Las Vegas, NV
USA

March 2024
at AGG1
Nashville, TN
USA

Launch April 2025
at Bauma
Munich, Germany

Launch March 2025
at AGG1
St Louis, MO
USA

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Nordberg HP Cone Range

Full coverage from small cones up to large sizes

	HP100	HP200	HP200e	HP300	HP350e	HP400	HP450e	HP500	HP600e	HP800e	HP900e
Head diameter	735 mm 29"	940 mm 37"	940 mm 37"	1120 mm 44"	1120 mm 44"	1320 mm 52"	1320 mm 52"	1520 mm 60"	1520 mm 60"	1650 mm 65"	1780 mm 70"
Power rating	90 kW 125 hp	132 kW 200 hp	160 kW 200 hp	220 kW 300 hp	250 kW 350 hp	315 kW 400 hp	355 kW 450 hp	355 kW 500 hp	450 kW 600 hp	600 kW 800 hp	700 kW 900 hp
Total crusher Weight *)	6,470 kg 14,300 lbs	12,160 kg 26,800 lbs	12,260 kg 27,000 lbs	18,100 kg 39,900 lbs	18,300 kg 40,300 lbs	25,600 kg 56,400 lbs	26,000 kg 57,000 lbs	37,000 kg 81,600 lbs	37,400 kg 82,300 lbs	65,500 kg 144,400 lbs	77,960 kg 171,870 lbs
Feed opening CSFO **)	165 mm 6-1/2"	192 mm 7-1/2"	200 mm 8"	241 mm 9-1/2"	240 mm 9-1/2"	304 mm 12"	321 mm 12-5/8"	351 mm 14"	355 mm 14"	356 mm 14"	356 mm 14"

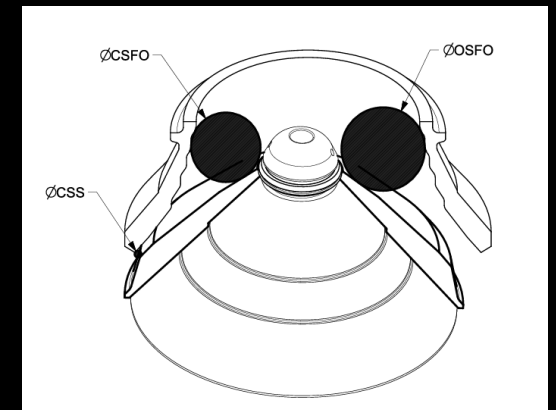
	HP3	HP4	HP5	HP6
Head diameter	1000 mm 39"	1120 mm 44"	1250 mm 49"	1400 mm 55"
Power rating	250 kW 350 hp	315 kW 400 hp	370 kW 500 hp	500 kW 650 hp
Total crusher Weight *)	16,100 kg 35,600 lbs	24,200 kg 53,400 lbs	29,000 kg 64,000 lbs	44,550 kg 98,200 lbs
Feed opening CSFO **)	220 mm 8-3/4"	252 mm 9-7/8"	317 mm 12-1/2"	331 mm 13"

In **WHITE**

Active models

In **RED**

Discontinued models



*) total crusher weight includes sub-frame and guards

**) feed opening more on open side and with large settings

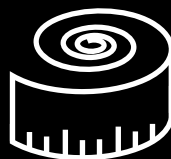
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HPe Cone Crushers – Externally The Same

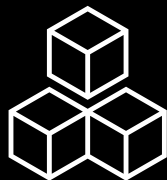
Internally gone through an evolution to offer much more



**Same
footprint**



**Same
dimensions**



**More options and features
to choose from**



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HPe Cone Crushers - More Productive

Evolution in performance

Kinematics

**Chamber
designs**



Power

Force

Metso

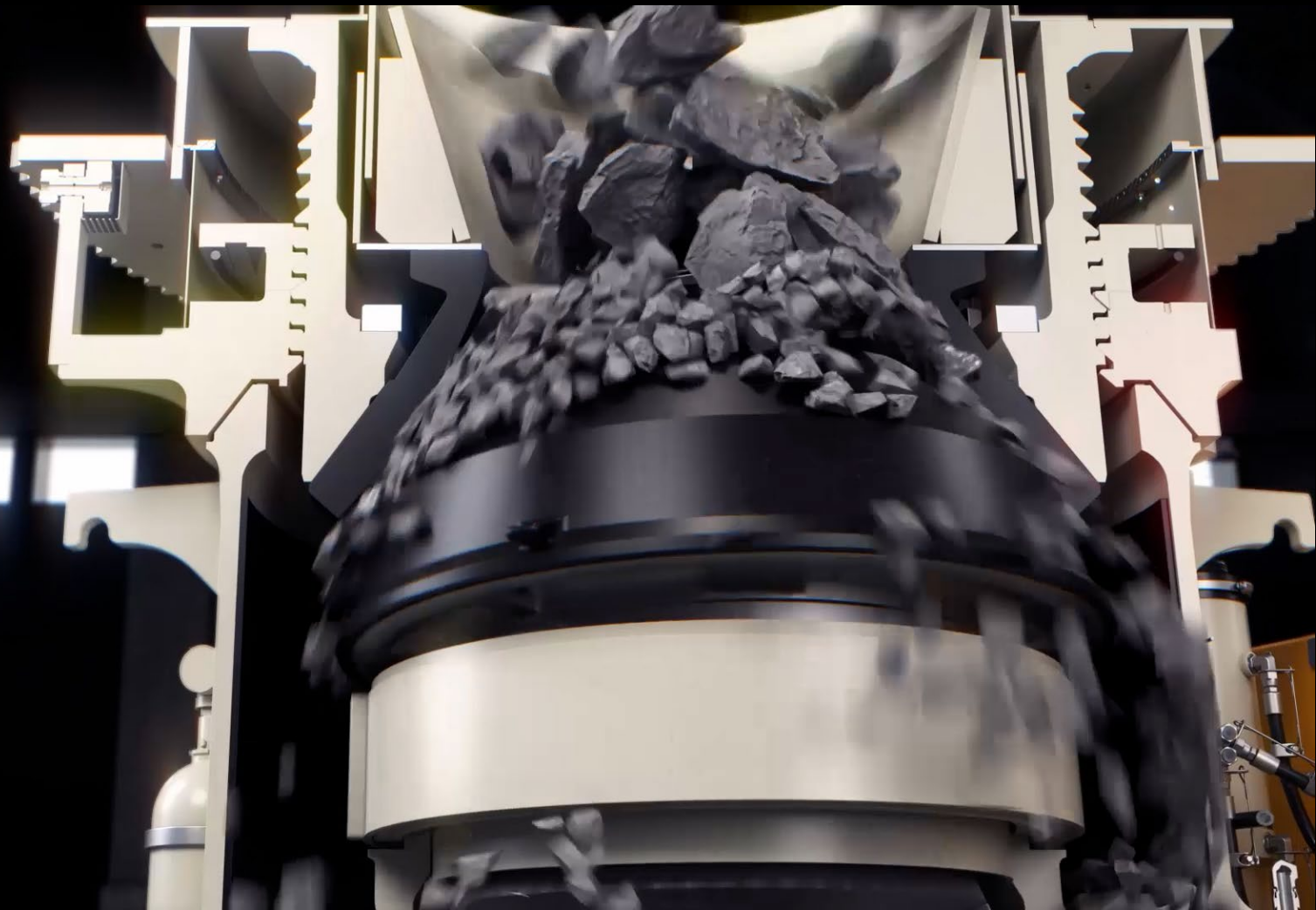
HP Cone Crusher - Performance

Improvements

- ✓ Kinematics
- ✓ Chamber designs
- ✓ Power
- ✓ Force

	Secondary up to	Tertiary up to
HP200e	+20%	+15%
HP350e	+10%	+10%
HP450e	+10%	+10%
HP600e	+20%	+15%

more throughput in tph



Evolution In Uptime And Serviceability

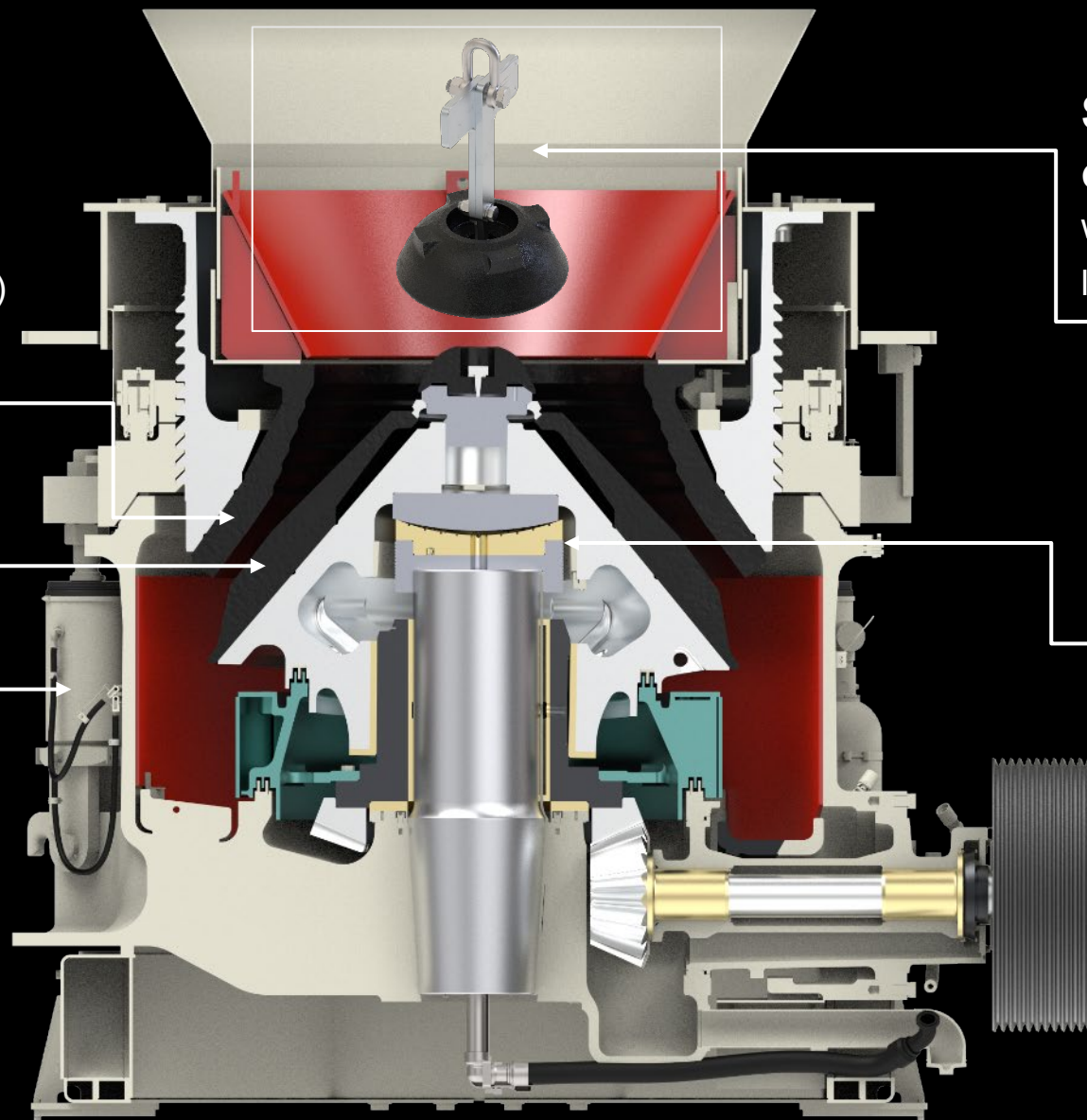
Quick, easy and safe liner change with no-backing liners up to HP600e size (including HP600e)

Enhanced tramp release cylinder mounting

Easy-to-remove cylinder connection

Safe lifting and handling of the feed cone
with the specific feed cone lifting tool

Extended liner life with head spin brake to slow down head spin on idle

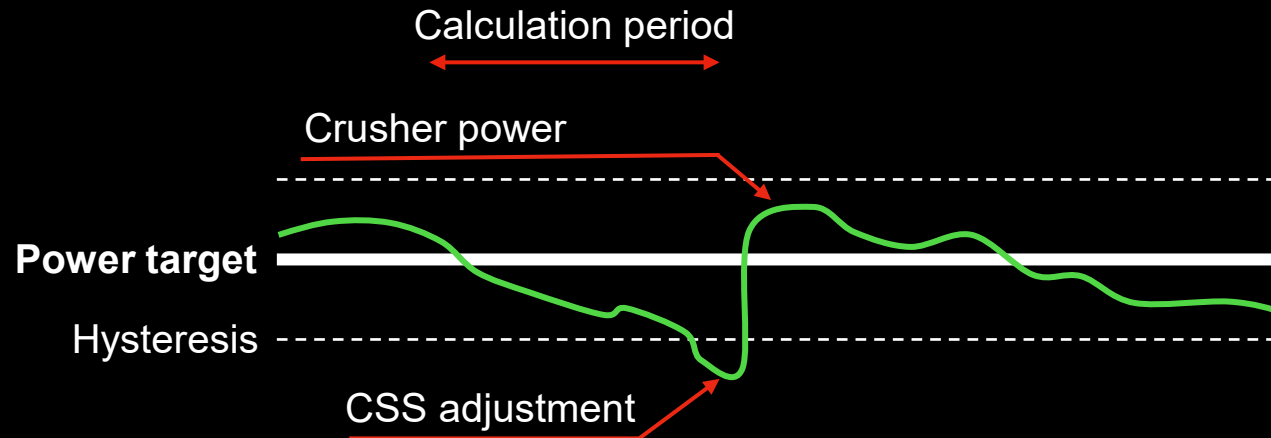


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IC70C Crusher automation

Setting mode provides maximum performance and process stability

- In setting mode, the crusher CSS is adjusted to maintain desired power draw and consistent production.
- The setting can be automatically compensated for wear or changes in feed characteristics.
- Automatic contact calibration checks the zero point for accurate setting adjustment.



**Feed rate
control also
available**

Evolution in Uptime and Serviceability with optional automation and ring bounce monitoring feature



Green → No ring bouncing



Orange → **W820** ring bouncing



Red → **W821** Consecutive ring bouncing



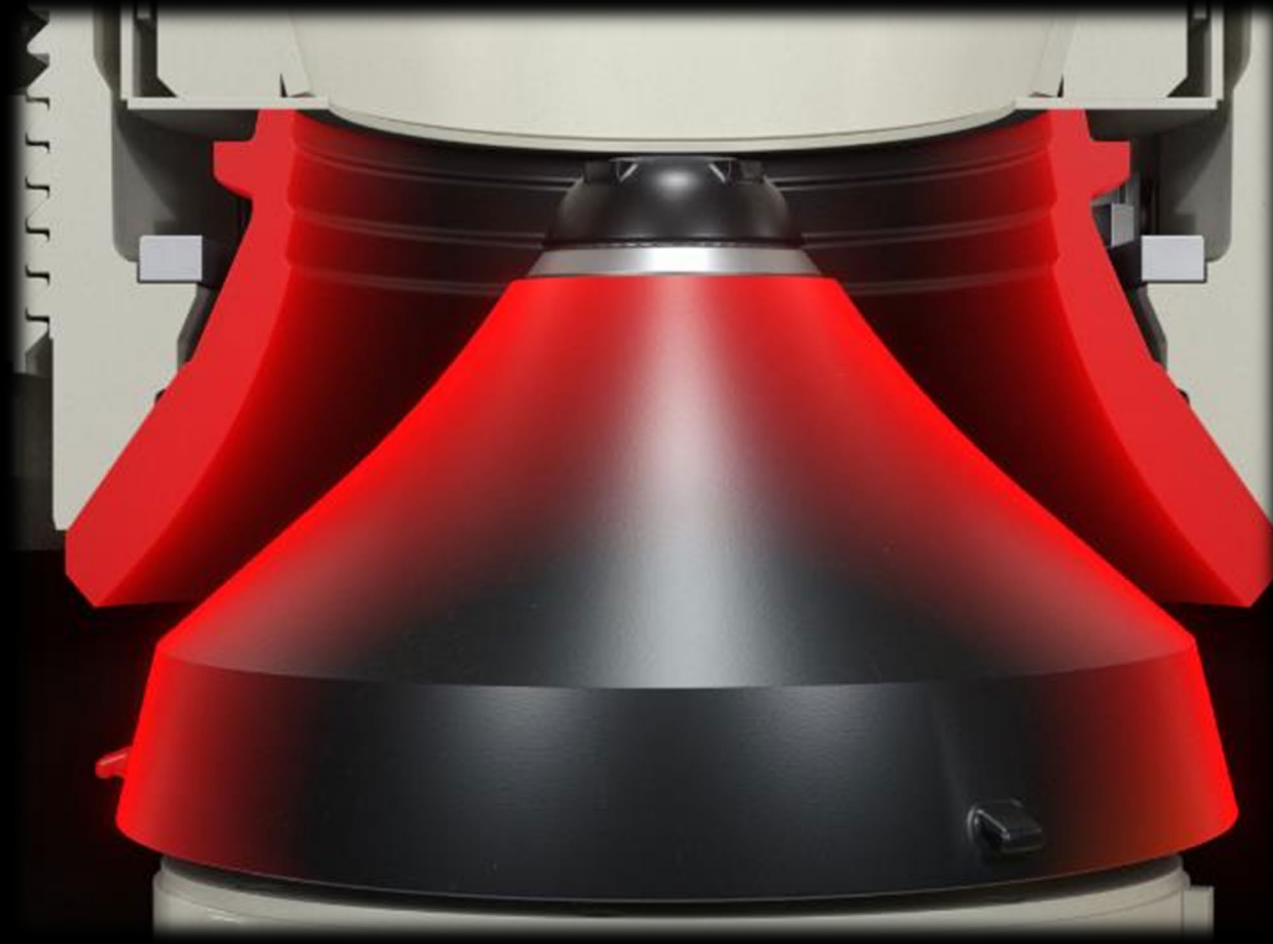
Red → **A822** Uncrushable event

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Optimal Chamber Profiles For All Applications

Improved uptime with no-backing liners

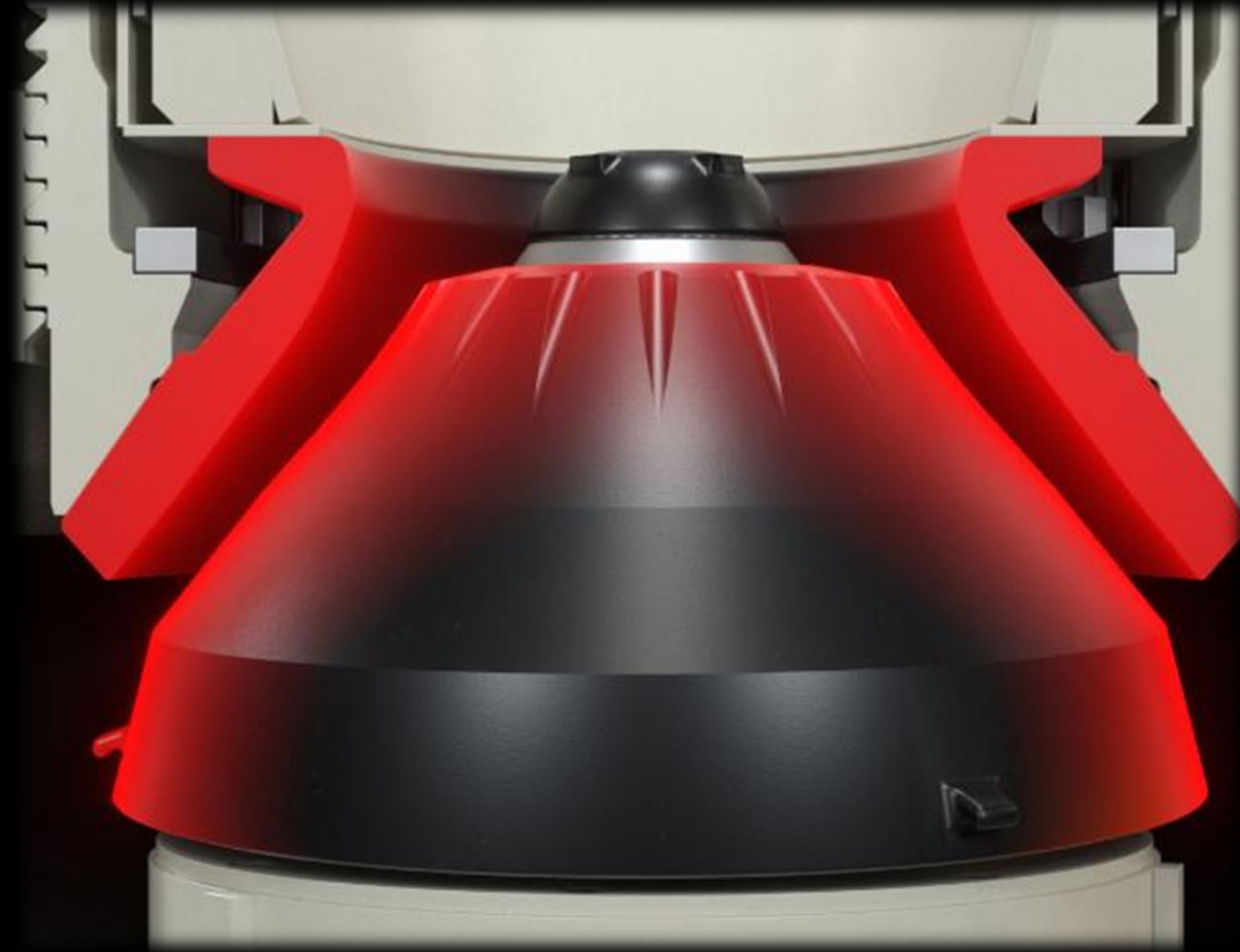
- Extremely wide liner offering from coarse secondary cavities to fine cavities
- New enhanced profiles to provide value
 - Enhanced profiles for improved crushing performance
 - Up-to 50% faster liner changes with no-backing liners
 - New application specific cavity profiles



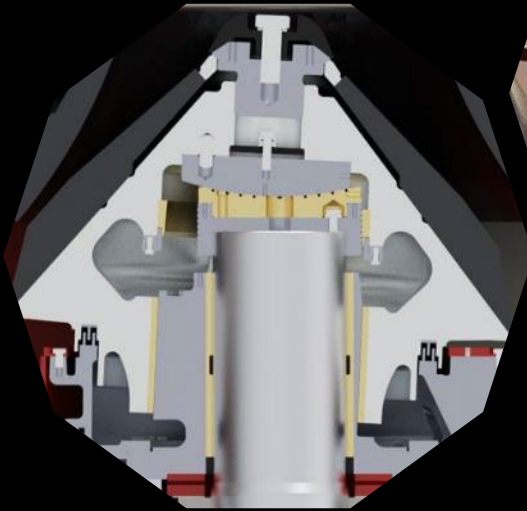
Optimal chamber profiles for any application

Evolution in application coverage

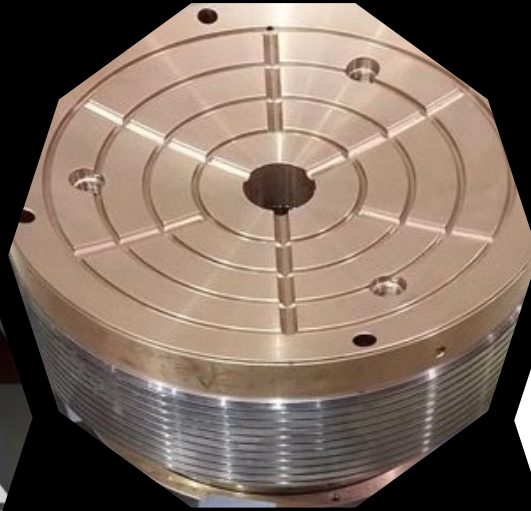
- (2) All new profiles for tertiary and quaternary crushing stage
 - Fine – NarrowFraction (F-NF) to minimize fines production
 - Sand cavity for manufactured sand



e-Features



Feature:
Enhanced kinematics



Feature:
Head spin brake



Feature:
No-backing liner
compatibility



Feature:
Ring bounce monitoring
(with IC70C)

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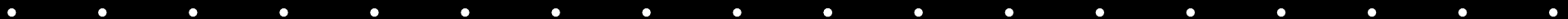
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PLUS

New Cone Crusher Development

The Cross Cone technology

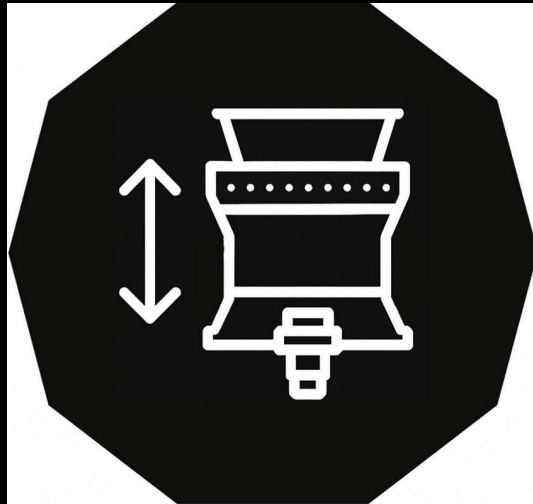


Metso
PLUS



Nordberg XC Series Cone Crusher

The best of two worlds



Hydraulic Cone
Crusher

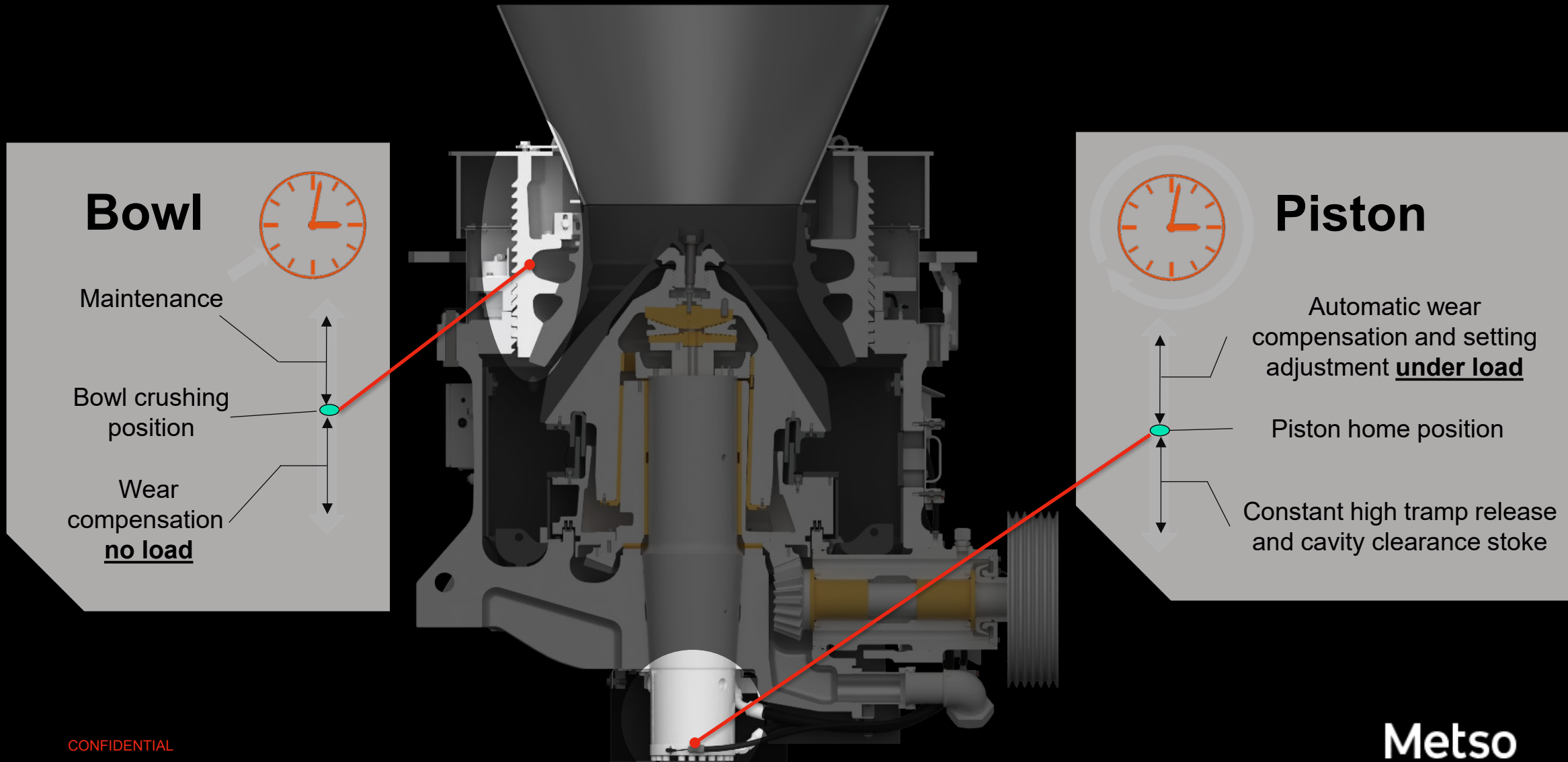


X-Cone
Technology



Fixed Shaft Cone
Crusher

Working Principle



Nordberg XC Series

Product range

	XC930	XC940	XC950
Maximum Feed Size	230mm	270mm	310mm
Maximum Installed Power	220 kW	300 kW	400 kW
Weight	13,900 kg	20,000 kg	28,000 kg
Head Diameter	990mm	1,144mm	1,346mm



Breaking The Rules!

- Dynamic wear compensation
- Setting adjustment under load
- Fast wear part replacement thanks to the bowl adjustment
- Higher wear part utilization ratio



Up to 10% higher uptime





CONFIDENTIAL



Bowl & Piston Technology



Operational cost reduction



Best performances



Reliability



Higher Uptime

Metso

Metso

Partner for positive change



[metso.com](https://www.metso.com)

RESTRICTED

